Space Weather Forecast

Issued on Monday, 13 November 2023 at 00:31 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of G1/Minor Storms on Day 1 (13 Nov) due to Coronal Mass Ejections effects. Chance of Moderate-class flares, declining through the period.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low with only Common-class flares in the last 24 hours. There are currently five sunspot regions on the disc. The largest region is in the northwest of the disc, perhaps with some minor magnetic complexity, however this is getting more difficult to assess as it starts to approach the limb. In the south-centre disc a region has grown rapidly in recent hours, although this growth now seems to be stabilising. The other regions appear relatively stable - but as with all regions approaching the west limb the analysis becomes more difficult. No new Earth-directed Coronal Mass Ejections (CMEs) have been observed in the past 24 hours.

Solar Wind / Geomagnetic Activity: Solar winds showed a CME arrival around 12/0530 UTC. Speeds have been elevated to slightly elevated, jumping up to around 580 km/s after the CME arrival, but since easing below 500 km/s. The total magnetic field strength was initially weak, becoming moderate as Earth entered the main portion of the CME. The north-south component was weakly southward directed after the CME arrival, becoming moderately northward directed in the main part of the CME, then rotating moderate southward directed just after 12/2200 UTC. Geomagnetic activity was Quiet to Unsettled (Kp 1-3), but with an Active (Kp 4) interval 12/0600-0900 UTC.

Energetic Particles / Solar Radiation: Solar radiation levels remained at background levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Four of the five sunspot regions currently on the disc are due to rotate off in the coming days. There is a gradually declining chance of Moderate-class flares occurring through the period, becoming a slight chance by Day 4 (16 Nov).

Solar Wind / Geomagnetic Activity: A CME arrived at Earth around 12/0530UTC. Impacts from this have been fairly muted so far, but there is a possibility of some slightly increased geomagnetic activity in the coming hours. A faint and slow CME was observed leaving the Sun late on 10 Nov. There is a chance of a glancing blow on Day 3 (15 Nov) but with very limited impacts expected. There may be a weak coronal hole fast wind currently, although this has been largely swamped by the CME. However, effects from this feature may prolong slightly elevated wind speeds into Day 2 (14 Nov).

Overall, geomagnetic activity may be Unsettled to Active with a chance of isolated G1/Minor Storm intervals at first due to CME effects. This gradually easing through Day 1 (13 Nov) to be Quiet to Unsettled for much of the rest of the period. Active intervals are possible on Day 3 should we see a glancing CME arrival.

Energetic Particles / Solar Radiation: There is a slight chance of S1 or greater radiation storm conditions should any of the western hemisphere sunspot groups produce significant flares in the period. This risk will wane through the period as these sunspots rotate well away from the western limb.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	25	1	5	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	35	30	20	15
Very Active	R3 to R5 X	No	5	5	2	2

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	2
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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